



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**04.06.1997 Bulletin 1997/23**

(51) Int Cl.<sup>6</sup>: **E21B 49/00, E21B 49/10**

(43) Date of publication A2:  
**28.02.1996 Bulletin 1996/09**

(21) Application number: **95304226.4**

(22) Date of filing: **19.06.1995**

(84) Designated Contracting States:  
**DE FR GB**

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(30) Priority: **17.06.1994 US 261512**

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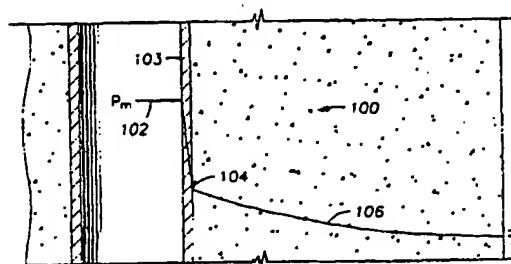
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(54) **Method for testing low permeability formations**

(57) An improved formation testing method for measuring initial sandface pressure and formation permeability in tight zone formations exhibiting formation permeabilities on the order of 1.0-0.001 millidarcies is based on pressure transients which occur shortly after a tester enters its pressure build-up cycle and substantially before reaching final build-up pressure. The method makes an estimate of formation permeability based on fluid decompression transients which occur in the for-

mation tester flowlines, shortly after the tester begins its build-up cycle. The method further estimates initial sandface pressure based on the change in pressure over time shortly after beginning the build-up phase. Accurate estimates of formation permeability and initial sandface pressure are thus made relatively early in the build-up cycle, thus substantially reducing the time required to make the pressure and permeability measurements.



**FIG. 1A**

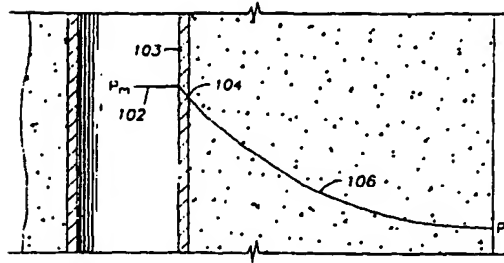


FIG. 1B



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# EUROPEAN SEARCH REPORT

Application Number  
EP 95 30 4226

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	WO 94 00671 A (WESTERN ATLAS INT INC) * abstract * * page 11, line 27 - page 12, line 9 * * page 27, line 10 - line 26 * * claims 18,22 * * figure 1 *	1	E21B49/00 E21B49/10
A	---	2-5	
X	PETROLEUM ENGINEER INTERNATIONAL, vol. 63, no. 5, 1 May 1991, OHIO, CLEVELAND, US, pages 40-44, XP000209868 DESBRADES R: "WIRELINE FORMATION TESTING: A NEW EXTENDED DRAWDOWN TECHNIQUE" * page 40, left-hand column, lines 6-23 * * page 41, left-hand column, lines 18-47 * * page 42, right-hand column, lines 21-57 * * page 44, left-hand column, lines 12-17 * * figures 7-10 *	1	
A	---	2-5	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E21B
E	EP 0 697 502 A (SCHLUMBERGER LTD; SCHLUMBERGER SERVICES PETROL (FR); SCHLUMBERGER) * abstract * * page 3, paragraph 1 * * claims 1,8 * * figure 1 *	1	
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The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 2 April 1997	Examiner Schaeffler, C
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document		T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application I: document cited for other reasons &: member of the same patent family, corresponding document	

EP 0 FORM 1 (03/01/92) (PC/C01)



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Application Number  
EP 95 30 4226

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
P,A	OIL AND GAS JOURNAL, vol. 92, no. 30, 25 July 1994, TULSA, OKLAHOMA, US, pages 84, 86/87, 90-93, XP000465382 EHLIG-ECONOMIDES C A ET AL: "THREE KEY ELEMENTS NECESSARY FOR SUCCESSFUL TESTING" * page 86, " Surface data readout " * * figure 3D *	1,3	
A	--- EP 0 520 903 A (SCHLUMBERGER LTD; SCHLUMBERGER SERVICES PETROL (FR); SCHLUMBERGER) * abstract * * page 3, line 39 - line 48 * * page 5, line 15 - line 27 * * page 7, line 14 - line 21 * * figure 4 *	1-5	
A	--- EP 0 530 105 A (SCHLUMBERGER LTD; SCHLUMBERGER SERVICES PETROL (FR); SCHLUMBERGER) * abstract * * column 2, line 34 - line 43 * * column 8, line 49 - column 9, line 3 * * claim 1 * * figure 1 *	1	
A	--- EP 0 126 680 A (SCHLUMBERGER LTD; SCHLUMBERGER PROSPECTION (FR)) * abstract * * column 4, line 52 - column 5, line 11 * * claim 1 * * figure 1 *	1	
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 2 April 1997	Examiner Schaeffler, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EP 91 FORM 1503 (11.91) (P&amp;C)



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Application Number  
EP 95 30 4226

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 424 (M-1024), 12 September 1990 & JP 02 167987 A (JAPAN METALS & CHEM CO LTD), 28 June 1990, * abstract * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 2 April 1997	Examiner Schaeffler, C
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EP 0 FORM 150 (03.85) (PDC/CH)